Claims

1. A method of determining the influence on microcirculation in living tissue from drugs, disease, injuries or normal regulation including:

   (i) illuminating a tissue surface with polarized light;

   (ii) collecting the backscattered light through a polarizing filter;

   (iii) detecting the backscattered and polarized light by a photo-sensitive array;

   (iv) transferring the collected information in digital form to a computing device;

   (v) separating the collected information into at least two data matrixes, each representing a specific wavelength range;

   (vi) generating an output data matrix by processing corresponding values in at least two data matrixes by an algorithm, wherein each value in said output data matrix represents the amount of influence on the microcirculation in a source point of the tissue, thereby obtaining a representation of the tissue microcirculation.

2. A method according to claim 1 including subjecting said tissue for local administration of a vasoactive agent.

3. A method according to claim 2, wherein iontophoresis is employed to support the administration of said vasoactive agent.

4. A method according to claim 2 or 3, herein said vasoactive agent is a vasodilator selected among acetylcholine and sodium nitroprusside.

5. A method according to claim 3 or 4, including presenting said output data matrix as an image colored or shaded in accordance with a scale of vasodilatation or vasoconstriction.

6. A method according to claim 1, wherein said polarizing filter provides a polarization direction orthogonal to that of said illuminating light.

7. A method according to claim 1, wherein said polarizing filter provides a polarization direction parallel to that of said illuminating light.

8. A method according to claim 1, including producing values for normalization of the values of said data matrixes by simultaneously illuminating a reference area.

9. A method according to claim 1, wherein said wavelength ranges represent specific colors.

10. A method according to claim 9, wherein said algorithm for generating the output data matrix employs the difference of the values of the data matrixes representing red and green color divided by the sum of the corresponding values of the data matrixes representing red and green color.

11. A method according to claim 1, including an algorithm for generating compensation for tissue color using the values in the data matrixes.

12. A system for determining microcirculation of a living tissue comprising:

(i) a light source (D) and a filter (C) capable of illuminating a tissue surface with polarized light,

(ii) a polarizing filter (F) for collecting the backscattered light;

(iii) a photosensitive array (H) capable of detecting the backscattered and polarized light and converting the detected light to a collected information of digital values;

(iv) a computing device (I) receiving said collected information and adapted to separate it into at least two data matrixes (J), each representing a specific color and to employ an algorithm that generates an output data matrix (L) representing the microcirculation.

13. A system according to claim 12 comprising means (M) for presenting said output data matrix as an image of the vasodilatation or vasoconstriction colored or shaded in accordance with a scale of vasodilatation or vasodilatation.

14. A system according to claim 12, wherein said polarizing filter provides a polarization direction orthogonal to that of said illuminating light.

15. A system according to claim 12, wherein said polarizing filter provides a polarization direction parallel to that of said illuminating light

16. A system according to claim 12, comprising a reference area for producing a measurement value for normalization of the values of the said data matrixes.

17. A system according to claim 12, wherein said algorithm for generating the output data matrix employs the difference of the values of the data matrixes representing red and green color divided by the sum of the corresponding values of the data matrixes representing red and green color.

18. A system according to claim 12, wherein said computing device comprises an algorithm for generating compensation for tissue color using the values in the data matrixes.

19. A system according to claim 12, comprising flexible optical fibers capable of directing illuminating light to a body cavity from the light source (D) and to direct backscattered light to the photosensitive array (H).

20. A system according to claim 12 adapted to cooperate with a mobile communication terminal capable of transmitting the output data matrix over a telecommunication network.

21. A system according to claim 20 integrated with a mobile communication terminal.

22. A system according to claim 20 having a separate mobile communication terminal connected to said system with communication links.

23. A method of determining if a patient suffers from abnormalities in microcirculation comprising:

(i) illuminating a tissue surface with polarized light;

(ii) collecting the backscattered light through a polarizing filter;

(iii) detecting the backscattered and polarized light by a photo-sensitive array;

(iv) transferring the collected information in digital form to a computing device;

(v) separating the collected information into at least two data matrixes, each representing a specific wavelength range;

(vi) generating an output data matrix by processing corresponding values in at least two data matrixes by an algorithm, wherein each value in said output data matrix represents the amount of influence on the microcirculation in a source of point of the tissue, thereby obtaining a representation of the tissue microcirculation;

(vii) comparing the output matrix data or its representation with a reference obtained from a healthy individual, or from the same patient prior to the administration of the vasoactive composition.

24. A method according to claim 23, wherein said abnormalities are representations of blood pressure drop, vascular shock or the presence of vascularized tumors.

25. A method according to claim 23, wherein said abnormalities represent complications of impaired microcirculation arriving from diabetes or Alzheimer's disease, comprising a first step of subjecting the patient to local administration of a vasoactive composition.

26. A method according to claim 25, wherein the vasoactive composition comprise at least one vasodilatating agent.

27. A method according to claim 25, wherein the vasoactive composition comprises a first agent exerting its vasodilatating activity by the smooth muscles and a second agent that exerts its vasodilatation activity by the endothelium.

28. A method according to claim 25 or 26, wherein the vasodilatating agents are selected among acetylcholine and sodium nitroprusside.

29. A method according to any of claims 25 to 28, wherein the local administration of vasoactive composition is supported with iontophoresis.

30. A method according to any of claims 25 to 29, including presenting said output data matrix as an image colored or shaded in accordance with a scale of vasodilatation or vasoconstriction.

31. A method according to claim 25, wherein said polarizing filter provides a polarization direction orthogonal to that of said illuminating light.

32. A method according to claim 25, wherein said polarizing filter provides a polarization direction parallel to that of said illuminating light.

33. A method according to claim 25, including producing values for normalization of the values of said data matrixes by simultaneously illuminating a reference area.

34. A method according to claim 25, wherein said wavelength ranges represent specific colors.

35. A method according to claim 34, wherein said algorithm for generating the output data matrix employs the difference of the values of the data matrixes representing red and green color divided by the sum of the corresponding values of the data matrixes representing red and green color